

### ABSTRACT

The invention features a method including: (i) providing an interference signal  $S(t)$  from two beams derived from a common source and directed along different paths, wherein the signal  $S(t)$  is indicative of changes in an optical path difference  $n\tilde{L}(t)$  between the different paths, where  $n$  is an average refractive index along the different paths,  $\tilde{L}(t)$  is a total physical path difference between the different paths, and  $t$  is time; (ii) providing coefficients representative of one or more errors that cause the signal  $S(t)$  to deviate from an ideal expression of the form  $A_1 \cos(\omega_R t + \varphi(t) + \zeta_1)$ , where  $A_1$  and  $\zeta_1$  are constants,  $\omega_R$  is an angular frequency difference between the two beams, and  $\varphi(t) = nk\tilde{L}(t)$ , with  $k = 2\pi/\lambda$  and  $\lambda$  equal to a wavelength for the beams; (iii) calculating a quadrature signal  $\tilde{S}(t)$  based on the signal  $S(t)$ ; and (iv) reducing the deviation of  $S(t)$  from the ideal expression using an error signal  $S_\psi(t)$  generated from the coefficients and error basis functions derived from the signals  $S(t)$  and  $\tilde{S}(t)$ .